

Historical approaches to post-combat disorders

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Almost every major war in the last century involving western nations has seen combatants diagnosed with a form of post-combat disorder. Some took a psychological form (exhaustion, combat fatigue, combat stress reaction and post-traumatic stress disorder), while others were characterized by medically unexplained symptoms (soldier's heart, effort syndrome, shell shock, non-ulcer dyspepsia, effects of Agent Orange and Gulf War Syndrome). Although many of these disorders have common symptoms, the explanations attached to them showed considerable diversity often reflected in the labels themselves. These causal hypotheses ranged from the effects of climate, compressive forces released by shell explosions, side effects of vaccinations, changes in diet, toxic effects of organophosphates, oil-well fires or depleted-uranium munitions. Military history suggests that these disorders, which coexisted in the civilian population, reflected popular health fears and emerged in the gaps left by the advance of medical science. While the current Iraq conflict has yet to produce a syndrome typified by medically unexplained symptoms, it is unlikely that we have seen the last of post-combat disorders as past experience suggests that they have the capacity to catch both military planners and doctors by surprise.

Keywords: post-combat disorders; shell shock; post-traumatic stress disorder; disordered action of the heart; Gulf War Syndrome

1. INTRODUCTION

Over the last century, post-combat disorders have been a significant health feature of major wars between western nations. On the surface, they appear to exhibit marked differences in their nature and the explanations attached to them. The South African War (1899–1902), for example, saw large numbers of British servicemen discharged from the armed forces with a diagnosis of disordered action of the heart (DAH), thought to be the effect of exertion on a soldier's chest constricted by tight webbing and equipment. Shell shock was the pre-eminent functional disorder of the First World War, characterized by tremor, restricted movement and nervous exhaustion. At first, it was thought to be the result of the concussive or toxic effects of exploding shells. During the Second World War, when physicians were concerned by an epidemic of gastro-intestinal disorders, explanations attached to medically unexplained symptoms often referred to diet or the stress of a novel military environment. By contrast, the symptoms of so-called Gulf War Syndrome (GWS) were ascribed to an immune or central nervous system damaged by a variety of toxins.

It has been argued that GWS is a unique disorder, a discrete illness related solely to exposures in the Gulf War, and as such has nothing in common with earlier post-combat disorders. There are three possibilities. Firstly, post-combat disorders arising in the twentieth century were in essence the same phenomenon and any

apparent distinctions occurred because both doctors and patients emphasized symptoms that interested them or reflected popular health fears. Secondly, these disorders had much in common with each other but their differences were sufficient to designate them as varieties of a species. Thirdly, each one was quite distinct with unique causes and pathological mechanisms. This paper addresses this nosological question but also explores why war syndromes recur, why they attract popular attention and what factors determine their form.

2. DEFINITIONS

Groups of medically unexplained symptoms arising in servicemen during times of conflict have recently been given the generic terms: 'war syndromes' (Hyams *et al.* 1996) or 'post-combat disorders' (Coker *et al.* 1999). The former is more accurate since many of those who experience these disorders have not been engaged in fighting but found themselves unable to function normally when training, deployed to rear areas or faced with the prospect of battle. Based on their effects, they can be divided into short and long term, the latter persisting beyond a month. Neither group necessarily implies anything about severity (table 1).

Combat is probably the most intense stressor known to human beings: the imminent, enduring but unpredictable threat to life. Its effects are heightened by the fact that servicemen are usually in the prime of life, while some may have wives and small children. The traumatic experience of war can lead to acute disorders, which have been given a variety of labels and range from shell shock to combat stress reaction (CSR). These were suffered either by inexperienced soldiers

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Table 1. War syndromes from 1900 to present.

disorder	short-term	long-term
pre-1914	wind contusion	nostalgia neurasthenia, palpitation, soldier's heart, irritable heart, Da Costa's syndrome, disordered action of the heart (DAH), psychogenic rheumatism
First World War	shell shock	shell shock/neurasthenia, DAH, effort syndrome, neurocirculatory asthenia (NCA), gas hysteria
Second World War	exhaustion, battle exhaustion, flying stress	psychoneurosis, war neurosis, non-ulcer dyspepsia, cardiac neurosis, effort syndrome, old sergeant syndrome
Korean War	combat exhaustion	psychoneurosis, war neurosis, non-ulcer dyspepsia, effort syndrome
Vietnam	combat fatigue	effects of Agent Orange, post-Vietnam syndrome, delayed stress response syndrome
post-1980	acute stress disorder, acute stress reaction, battleshock, combat stress reaction (CSR)	post-traumatic stress disorder, Desert Storm Syndrome, Gulf War Syndrome, Gulf-related illness

cast into battle without time to acclimatize or by replacements sent to units where they were not welcomed or wanted. Alternatively, experienced and hitherto successful soldiers could be worn down by prolonged exposure to combat, finding themselves no longer able to cope with the omnipresent threat of death or serious injury, so-called 'old sergeant syndrome' (Shephard 2000).

Many of the symptoms that characterize short-term disorders are psychological, though not exclusively so, and they have one feature in common: an inability to perform tasks. In 1995, for example, the Israel Defence Forces defined CSR as 'a normal and transitional crisis stemming from exposure to the stress of combat in unfavourable external circumstances, such as the lack of social support from fellow soldiers or officers, physical deprivation such as lack of food or sleep' (Shalom *et al.* 1995, p. 260). This causal definition focused on the situation in which the serviceman found himself rather than on any pre-dispositional psychology. Subsequently, Solomon wrote:

A CSR occurs when a soldier is stripped of his psychological defences and feels so overwhelmed by the threat that he or she becomes powerless to counteract or distance himself or herself from it and is inundated by feelings of utter helplessness and anxiety. In this state, the soldier is a danger to self and unit and is no longer able to perform military duties

(Solomon 2001, p. 11).

Treatment in so-called 'forward psychiatric' centres involved rest and reassurance and graduated exercise, the 'PIE' method, the acronym being based on proximity to battle, immediacy and expectation of recovery. Experience from the First and Second World Wars showed that few (possibly less than 20%) were able to return to combatant roles and, though most remained in the armed forces, they went to combat-support or base duties (Jones & Wessely 2003). What remains uncertain about acute presentations was the extent to which they predisposed servicemen to more chronic psychological disorders, such as post-traumatic stress disorder (PTSD) and neurasthenia or to disorders that featured medically unexplained symptoms. An important study conducted in the aftermath of the Lebanon War of 1982 suggested that patients

who had been treated for CSR in forward units were less likely to develop PTSD than those referred to base hospitals (Solomon & Benbenishty 1986). However, an inherent bias in the selection of soldiers for immediate treatment undoubtedly influenced these findings; men with a better prognosis were sent to forward units. An opposite bias could have resulted from the observation that commanders have traditionally used medical referrals as a way of getting rid of disruptive servicemen, those who might be expected to have a poor outcome. Furthermore, soldiers in one of the non-PIE groups had been flown to base hospitals in Israel. It is possible that a higher threshold for CSR was required for a commander to request an evacuation by air.

3. EARLY WAR SYNDROMES

Because of changes to the meaning of words and the ways that emotions were conceptualized, it is difficult to know what clinical phenomena were being described by military physicians any earlier than in the mid-nineteenth century. Despite this etymological problem, some have speculated that PTSD can be detected in Homer's *Iliad* (Shay 1991), the diaries of Samuel Pepys (Dally 1983), in an account of Italian avalanche victims of 1755 (Parry-Jones & Parry-Jones 1994) or in veterans of the American Civil War (Dean 1997). These observations are predicated by the belief that PTSD is a universal trauma reaction, a timeless disorder that has only recently been identified. As a result, it has been suggested that the disorder has masqueraded under other labels such as 'railway spine' and even 'shell shock' (Trimble 1985). By contrast, Young argued that PTSD was a culturally conditioned response to trauma, one that is

glued together by the practices, technologies and narratives with which it is diagnosed, studied, treated and represented and by the various interests, institutions and moral arguments that mobilized these efforts and resources

(Young 1995, p. 5).

Furthermore, a study of flashbacks experienced by veterans from 1900 to the present showed a significant increase in the incidence of the symptom after the Vietnam War (Jones *et al.* 2003a), lending support to

the hypothesis that soldiers respond to trauma in a variety of ways.

Because so many soldiers and sailors died of disease, accidents or the effects of wounds, concern about psychological effects was scarcely on the agenda for the eighteenth-century soldier. Nevertheless, during the Napoleonic Wars cases of 'cerebro-spinal shock', typified by tingling, twitching and even partial paralysis, were described in soldiers who had been close to the passage of a projectile or its explosion but not suffered a physical wound. Termed 'wind contusions', cases were treated with scepticism by military physicians (Anonymous 1914). It is possible that the description 'windy' (meaning lack of courage) derived from this phenomenon. However, it would have been strange, indeed, if British soldiers exposed to the stress of battle during the Napoleonic Wars had not found physical outlets for their fears in ways that would avoid an accusation of cowardice. At present, we do not know what form the post-combat disorders of the eighteenth century took.

Of older provenance was the disorder termed nostalgia. Described in various Swiss and Spanish accounts of the seventeenth century, sufferers exhibited a state of deep despair found in conscripted troops sent to foreign territories, where they had little prospect of leave (Rosen 1975). Writing in 1678, Johannes Hofer believed it was due to pathological processes in those parts of the mind where images of desired persons and places were stored. Treatment, in the form of purges, was designed to improve digestion thereby freeing up vital spirits. Patients were also encouraged by the promise of leave and the provision of diverting company, while chronic cases were sent home as this was shown in most cases to produce a cure. A novel explanation was proposed by J. J. Scheuchzer to explain the incidence of nostalgia among Swiss troops. As mountain people, he argued, they inhale refined air, which is also carried into the body by food and drink. When they descend to the lowlands, the delicate fibres of the skin are compressed, the blood forced into the heart and brain, its circulation is slowed. If a soldier was unable to resist these deleterious effects then anxiety and homesickness were thought to have resulted (McCann 1941). Treatment principally involved moving the soldier back to the mountains or the administration of youthful wine and saltpetre to increase internal body pressure.

Yet cases of nostalgia were not confined to the Swiss and found in French and German eighteenth-century accounts and even among sailors of the Royal Navy. By 1800, it had become a recognized hazard of troops on campaign, and was increasingly categorized as a form of melancholy. Nostalgia came to prominence during the American Civil War when rates of 2.3 per thousand and 3.3 per thousand were recorded among northern troops in 1861 and 1862, respectively. Assistant Surgeon De Witt C. Peters observed that it was particularly prevalent among inexperienced troops serving in the far south where mail was irregular. J. T. Calhoun, an army surgeon, believed that the main cause was the recruitment of poorly motivated soldiers with unrealistic expectations of what war involved. Calhoun advocated a generous furlough system in

place of the existing system by which leave was granted only as a reward for re-enlistment or to deal with emergencies at home.

The diagnosis of nostalgia did not find favour with doctors in the British army, who in the nineteenth century at least preferred the diagnosis melancholia. An analysis of over 6200 cases of Chelsea Hospital pensions dating from the late 1880s showed that 37 (0.6%) were for melancholia or mania, while no cases of nostalgia were recorded (Jones *et al.* 2002a).

4. DISORDERED ACTION OF THE HEART

Also known as irritable heart, soldier's heart, cardiac neurosis, Da Costa's syndrome, neurocirculatory asthenia and effort syndrome, DAH was one of the most common and enduring post-combat disorders (Jones & Wessely 2005a). First recorded by the British in the Crimea, when termed 'palpitation', and by the Americans as 'cardiac muscular exhaustion' during the Civil War (Hartshorne 1864), it was a consistent feature of military medicine from the late nineteenth century to the Second World War.

Discharges from the British Army for 'diseases of the circulatory system' became a serious cause for concern in 1864 following a presentation at the Royal United Services Institute by Maclean (1811–1898), Professor of military medicine at the Army Medical School, Netley (Maclean 1864). Although Britain was not then at war, such soldiers broke down either under the rigours of training or as a result of earlier overseas service in the Crimea and India. To shed light on this problem, Maclean investigated 5500 soldiers admitted to the medical division of the Royal Victoria Hospital, Netley, who had served abroad between 1863 and 1866, and found that 8% had been invalidated from the forces with what appeared to be heart disease. At Fort Pitt, where invalids serving in the UK were treated, he estimated that 15% were discharged with heart disease (Maclean 1867). Having excluded rheumatism, excessive alcohol consumption, heavy smoking or over exertion as causes, Maclean considered that the weight and distribution of the soldier's equipment were responsible:

The pack-straps press on important muscles, arteries, veins and nerves to a degree which only those who have carried the loaded pack can appreciate. The weight, especially when the greatcoat... is strapped on, falls, to a great extent, without the line of the centre of gravity... You can well imagine how impossible it must be to make severe exertion under so many disadvantages without suffering

(Maclean 1867, p. 162).

He considered that webbing supporting a pack constricted the major blood vessels supplying the heart forcing it to pump excessively hard to maintain circulation. Having reached a similar conclusion, the 1865 War Office inquiry recommended the redesign of equipment affecting the chest (Anonymous 1865). The marked differences in incidence between units, Maclean believed, related to morale: 'in well-disciplined regiments the practice of falling out at drill or on the line of march is discouraged, and men will bear and

suffer much, rather than incur the imputation of being 'soft' (Maclean 1864, p. 111).

A further survey of 1635 cardiac admissions to Netley between 1863 and 1869 by A. B. R. Myers, assistant surgeon to the Coldstream Guards, found that 1322 (80.9%) were discharged from the forces and only 276 (16.9%) returned to duty (Myers 1870, p. 4). Having observed that heart disorders were 'more prevalent in the army than the civil population', Myers concluded that three factors accounted for this difference: rheumatic fever, Bright's disease and violent manual labour. He, too, pointed a finger at the soldier's equipment:

His waist-belt adds to the constriction below the chest, and his tunic collar above it... and then, to complete the artificial chest case, the knapsack straps supply all that is requisite, whilst the pouch-belt adds its share to the general compression. The chest, thus fixed as it were in a vice, has little or no power of expansion, and the circulation through the heart, lungs and great vessels is proportionately impeded

(Myers 1870, p. 81).

Concern in the UK mounted in 1876 when re-designed equipment failed to prevent new cases of irritable heart. Despite clear evidence that there was an association with combat, Surgeon Arthur Davy suggested that the setting-up drill caused an over expansion the chest, which in turn produced dilatation of the heart thereby inducing 'irritability' (Wilson 1916, pp. 119–120). Hence, late-nineteenth century investigations of DAH identified a mechanical pathology, whether hypertrophy, valvular lesion or aortic dilatation and proposed mechanical causes, commonly an obstruction of the heart's outflow (Howell 1998). Because there was no effective treatment of these supposed organic conditions, servicemen were simply discharged, while military physicians sought ways to prevent new cases.

Evidence gathered from the American Civil War failed to clarify the situation. Jacob Da Costa (1833–1900), who had studied the phenomenon during the American Civil War (Wooley 1982), concluded that there was no clear-cut cause, though his analysis of 200 cases (selection criteria were not stated) showed that 38.5% had been subject to 'hard field service and excessive marching', and a further 30.5% had previously suffered from diarrhoea (Da Costa 1871, p. 37; Wooley 2002). Since 'irritable heart', as Da Costa termed the disorder, was not confined to the infantry but affected the cavalry and artillery, he argued that the webbing and packs, which varied between these arms, could not have been the primary cause. Although this was widely regarded as a disorder suffered by soldiers in wartime, Da Costa made the important observation that the same cluster of symptoms could also be seen in civilians.

DAH was a major cause of invalidity during the South African campaign. According to official statistics, 3631 servicemen were hospitalized with DAH, and of these 41% were invalided to the UK, where they were generally discharged (Mitchell & Smith 1931, p. 273). The highest incidence of DAH was reported in orderlies of the Royal Army Medical Corps, explained by the great distances that field units were required to march to support fighting battalions (Wilson 1904). In the latter stages of the war, a large number of small

columns were deployed against the Boers so that medical units had long periods of continuous marching to keep up with the widely spread engagements. It was concluded that the prolonged strain of carrying heavy weights and the pressure of straps on the chest had damaged the heart. An official report also argued that 'cardiac exhaustion cases were much more frequent among men of volunteer companies than the regulars, probably due to the great difference of their usual daily occupation from the life of a soldier on active service' (Wilson 1904, p. 73)—an observation that would be repeated during the next century. Once a soldier had succumbed to DAH, it was noticed that the symptoms returned if he had to 'undergo any extra exertion or from the excitement or nervousness of going under fire'. The incidence of such disorders also increased 'if the physical strength of the men cannot be kept up by good and sufficient food and the necessary amount of sleep and rest'. Thus, the finite resources of soldiers under fire had been observed but their implications not fully understood (Jones & Wessely 2001).

Although shell shock was the quintessential war syndrome of 1914–1918, soldier's heart or DAH was, in fact, equally common. Because of the need to return as many soldiers as possible to some form of duty, much concerted investigation was directed towards the disorder. Traditional explanations of improper drill and faulty equipment were rapidly abandoned in favour of more sophisticated medical hypotheses such as excessive glandular secretions or infectious micro-organisms. Early in 1916, Sir James Mackenzie argued that the privations of trench warfare not only weakened men's constitutions but also provided a suitable habitat for toxic bacteria (Mackenzie 1916). The net result, he believed, was a state of general exhaustion and that heart abnormalities were not cardiac in origin, but the outcome of injury to the central nervous system (Wooley 1986a). This interpretation had parallels in the late-nineteenth century idea that neurasthenia was a consequence of influenza or typhoid infection. Despite the existence of toxic or post-infective explanatory models these did not achieve widespread popularity, in contrast to the latter part of the twentieth century when they were used to account for the effects of Agent Orange and GWS.

Specialist military hospitals were set up at Mount Vernon, Hampstead and Colchester under Thomas Lewis to find more effective treatments (Wooley 1986b). Lewis redefined the disorder as 'effort syndrome' in a way that reflected 'the transformation of the concept of heart disease from static and anatomical to dynamic and physiological' (Howell 1998, p. 85). This re-evaluation allowed military physicians to think of remedial interventions, such as graduated exercise, rather than discharge to a life of invalidity. Although he was unable to discover the cause of DAH, Lewis ruled out a number of organic factors, including valvular lesions. By the end of the war, he had identified three possible pathological mechanisms: decreased buffer salts in the blood, an increased leucocyte count and abnormalities in urinary constituents (Christophers 1997). However, none of these hypotheses were mentioned in the 1940 edition of Lewis's *The Soldier's Heart and the Effort Syndrome*, which suggests that further investigation had failed to

establish a connection. Nevertheless, Lewis continued to believe that this was a disorder of functional capacity and that the symptoms represented 'exaggerated manifestations of the healthy responses to effort' (Lewis 1917, p. 7).

5. RHEUMATISM

During the Boer War, rheumatism or muscle and joint pain associated with fatigue became a prominent cause of invalidity. 'Among the symptoms we find prominently', recalled Anthony Bowlby (1855–1929), a civil surgeon who had worked at the Portland Hospital in Rondebosch and Bloemfontein during 1900, were 'pain, in the form of headache, generally posterior, pains in the neck, pains in the back and limbs, so that these cases are generally sent back as cases of rheumatism; general feebleness of the muscular system amounting to paralysis more or less pronounced' (Bowlby *et al.* 1901, p. 129). The Boer War saw 24 460 troops admitted to hospital with rheumatic fever or rheumatism, of whom 4305 were evacuated home. Although today rheumatic fever, a disease that can cause heart failure, is differentiated from non-articular rheumatism (a disorder characterized by subjective symptoms such as joint pain, stiffness and tenderness), physicians in the nineteenth century were unable or unwilling to draw such a distinction.

A systematic investigation of surviving war pension files administered by the Royal Hospital, Chelsea, has shown that most veterans who had been awarded a pension for rheumatism showed no objective signs of disease within a few years of discharge (Jones *et al.* 2002a,b). Dr J. W. Washbourn, who ran the Imperial Yeomanry Hospital at Pretoria in the latter stages of the war, treated 296 cases of chronic muscular rheumatism (the fourth most common medical disorder there) but was unable to establish an association with rheumatic fever. At a loss to explain the phenomenon, Washbourn considered that the joint and muscle pain was the result of 'the men's food and especially the want of fresh vegetables' (Washbourn 1901, p. 394). An explanation offered by both veterans and Royal Army Medical Corps doctors was that exposure to cold and wet on the veldt had caused their rheumatic pains. Because the cardiac complications of rheumatic fever were then untreatable and often led to invalidity and premature death, pains in muscles and joints were a contemporary focus of concern for both patients and physicians.

6. SHELL SHOCK

Shell shock caught the popular imagination and has become a synonym for the hardships and trauma of trench warfare (Feudtner 1993; Shephard 1996). There is no accepted definition, though the Southborough Committee, appointed in 1920 to prevent any future epidemic of shell shock, came the closest:

emotional shock, either acute in men with a neuro-pathic predisposition, or developing as a result of prolonged strain and terrifying experience, the final breakdown being sometimes brought about by some relatively trivial cause. [Or] nervous and mental exhaustion, the result of prolonged strain and hardship (Southborough 1922, p. 92).

In practice, the chronic form of shell shock was expressed by medically unexplained symptoms, in particular tics, paresis, tremor, contractures, fatigue, headache, difficulty sleeping, nightmares, memory loss, poor concentration together with aches and pains. In addition, sufferers felt fatigued and were often unable to complete routine tasks. As such, it bore little resemblance to the modern definition of PTSD.

As has been seen, the cluster of symptoms expressed by any post-combat disorder usually has a civilian equivalent; effort syndrome and neurasthenia, for example, were not confined to the military. Some severe cases of shell shock bore a resemblance to Ganser's syndrome (ICD-10 1992). Characterized by 'approximate answers' and other dissociative symptoms, it was first observed in prisoners awaiting capital punishment. Soldiers about to go into battle plausibly entertained similar fears and resorted to similar defences, both conscious and unconscious.

Contemporaries were sharply divided over causation. Psychologically minded doctors believed that in some cases shell shock was the inevitable result of the sustained and intense stress of combat. W. H. R. Rivers, a medical anthropologist who treated cases of shell shock at Craiglockhart, believed that war neuroses arose when an adaptive form of repression failed. Because most troops were not regulars but had volunteered or been conscripted into the army and trained in great haste, they had not had time to build up an effective mechanism to deal with fear and anxiety. Faced with 'strains such as have never previously been known in the history of mankind', Rivers wrote, it was 'small wonder that the failures of adaptation should have been so numerous and severe' (Rivers 1918, p. 173). T. R. Elliott said that during his time as consultant physician to the British army in France he had come to the conclusion that shell shock was a result of persistent or recurring fear, which overrode the soldier's self control. Others, such as Gordon Holmes, consultant neurologist to the British Expeditionary Force, thought it was simply malingering or cowardice, while a number of military commanders thought the disorder preventable by the careful selection of recruits and training.

In essence, the report of the Southborough Committee sidestepped the contentious issue of causation by proposing a series of recommendations that were designed to prevent a re-occurrence of the shell shock epidemic. Firstly, the term was to be

eliminated from official nomenclature... No case of psycho-neurosis or of mental breakdown, even when attributed to a shell explosion or the effects thereof, should be classified as a battle casualty any more than sickness or disease is so regarded

(Southborough 1922, p. 190).

Such was the appeal of the term shell-shock, concluded the committee 'that this class of case excited more general interest, attention and sympathy than any other, so much so that it became a most desirable complaint from which to suffer' (Southborough 1922, p. 6).

Secondly, the committee concluded that the incidence of shell shock would have been far lower if proper attention had been paid to the mental state of recruits. They were told by the chief recruiting officer for

London District that during the early phases of the war, when volunteers enlisted in their droves, medical inspections had been conducted in 'a most haphazard manner'. Between 20 and 30% had never seen a doctor and for the remainder the examination was usually cursory. One physician saw 400 men a day for 10 days. Hence, it appeared that the judicious selection of recruits could dramatically reduce those vulnerable to war neuroses. Furthermore, it was asserted that well-trained troops, properly led, would not suffer from shell shock and that the many servicemen who had succumbed to the disorder were either members of Kitchener's hastily assembled Pals' battalions or the unwilling conscripts that followed.

The report left the core dilemma unsolved: how to compensate the truly deserving (courageous men traumatized by combat) without rewarding those for whom psychological injury merely offered an escape from military duty (Shephard 1999). Its publication represented a high-water mark in the history of shell shock and henceforth the term disappeared from official medical and military vocabularies. This represented a remarkable paradox. Just at the time when the cultural significance of shell shock was beginning to gain ground, most particularly in its literary expression, it fell from use in psychiatric and medical texts until revived in the 1970s as an historical introduction to PTSD (Trimble 1981).

Reflected throughout the report was the fundamental ambivalence felt by the military to psychiatry, an unease that remains to this day. These ambiguities were revealed in the testimony of Charles Wilson, later Lord Moran and author of the *Anatomy of Courage* (1945). While Wilson conceded that in modern industrial wars every man had his breaking point, he had little sympathy for battalions in which shell shock was prevalent, regarding them as 'a disgrace' (Southborough 1922, p. 76). He thought shell shock 'very infectious, like measles'. In essence, the military can be compassionate and understanding provided it is considered that the sufferer has 'earned' his breakdown or spent sufficient time in danger. Alternatively, the armed forces can appear cold or rejecting if it is felt that the soldier has not done anything that might permit him to escape his responsibilities.

7. NON-ULCER DYSPEPSIA

Roy Grinker and John Spiegel, US military psychiatrists based in Algiers during 1943, observed that 'gastrointestinal symptoms flourish in an abundance and variety', in contrast with 'the frequent cardiac syndromes observed in the last war' (1945, pp. 254–255). From the outbreak of war the incidence of non-ulcer dyspepsia had become a 'major medical problem' for British armed forces (Hutchison 1941). In May 1942, digestive disorders accounted for 17% of all discharges for diseases from the army and RAF (Anonymous 1944). At first, it was hypothesized that dyspepsia represented a new entity akin to shell shock, while others suggested that it was due to an acute type of peptic ulceration. Yet studies soon showed that the incidence of ulcer in the civilian population had been growing steadily during the inter-war period and that

the gastric symptoms suffered by some servicemen predated their enlistment (Anonymous 1940).

At a time when diagnostic tools were at best unreliable, gastroenterologists and radiologists tended to err on the side of caution. Estimates of those with peptic ulcer among the vast numbers of soldiers with chronic dyspepsia ranged from 89% in 201 cases invalided from France to 45.5% in 88 consecutive UK admissions (Payne & Newman 1940; Hutchison 1941). A 1941 study, which included veterans of Dunkirk and the Lofoten raid, found an incidence of 64.2% in 246 servicemen admitted to a military hospital with gastrointestinal pain. The authors argued that a change in dietary habits together with the stress of a novel lifestyle were responsible (Graham & Kerr 1941). Similar conclusions about causation were reached at a special meeting held at the Royal Society of Medicine in March 1941: irregular mealtimes and the heavier nature of army food (Tidy 1941, 1943). Psychological factors were excluded because 'peptic ulcer and all dyspeptic disturbances were noticeably rare' during the First World War One when similar stresses arguably operated.

Not everyone agreed with this hypothesis. Hinds Howell reported 131 cases of 'neurotic dyspepsia' in 1941 at a UK military hospital, an increase of 12.4% over the figure for 1940 (Hinds Howell 1941). By contrast, he proposed a constitutional explanation:

those people of poor personality who in peacetime are only just able to accommodate themselves to their home environment are no longer able to do so when this is changed on enlistment to the discipline of army environment. Whether it is pure chance that their neurosis is centred on their digestion it is difficult to say (Hinds Howell 1941, p. 693).

Although studies conducted at the beginning of the war excluded psychological explanations, increasing contact with service patients led to a re-evaluation. An analysis of the social class and lifestyles of peptic ulcer mortalities led Morris and Titmuss to conclude that duodenal ulcer was a psychosomatic disorder related to a particular 'hypothalamic' type of personality. They considered that the stresses of metropolitan life, rather than nutritional factors, played a key causal role (Morris & Titmuss 1944, p. 841).

Retrospective studies, based on mortality statistics, established that the war years witnessed an epidemic of peptic ulceration that subsequently rose to a peak prevalence in the mid-1950s (Langman 1979). During the Second World War, there was no effective treatment for peptic ulcer, apart from risky gastrectomy, and a significant mortality from perforations fuelled a general fear of the disease (Anonymous 1945). This suggests that 'pure chance' was probably not the explanation for the increase in non-ulcer dyspepsia and that forms taken by conversion disorders are influenced by popular health fears and limitations of medical science.

8. EFFECTS OF AGENT ORANGE

Although effects of Agent Orange, observed in Vietnam veterans, reflected contemporary concerns with toxic exposures, it was far from being the first post-combat

disorder associated with poisoning. 'Gas hysteria', a term coined in the First World War, was employed to describe soldiers who had been exposed to low levels of chlorine or phosgene, appeared to have completely recovered from their physical effects and yet continued to suffer from ill-health. For pension purposes, many such cases were reclassified as DAH, so similar were their symptoms. Initially, Frederick Mott (1853–1926) hypothesized that shell shock was a neurological disorder caused by exposure to carbon monoxide and other gases released by exploding ordnance (Mott 1916). During the Second World War, the use of mepacrine (also known as atebtrin) in Italy and South East Asia, as a prophylaxis against malaria, led some British and Australian troops to believe that it had caused impotence, a fear encouraged by German propaganda leaflets (Walker 1952; Harrison 2004).

During the Vietnam War, dioxin (Agent Orange), a defoliant, was sprayed from aircraft over the jungle that provided cover for the Vietcong. Agent Orange derived its name, not from the chemical itself, as was popularly believed, but the colour of the drums in which it was stored. Some veterans suffering from chronic somatic symptoms attributed their illness to the effects of herbicide exposure, while it was also claimed to have been the cause of birth defects in their children. Indeed, the Vietnam Veterans Association of Australia suggested that exposure to Agent Orange could have led to a form of 'toxic neurasthenia' (Hall & MacPhee 1985). To date, scientific and epidemiological studies have failed to identify a causal link (Boyle *et al.* 1989; Anonymous 1994). However, it is noteworthy that the somatic symptoms frequently described by veterans who were exposed to Agent Orange were similar to those associated with other war-related illnesses (Holden 1979). Exposure to Agent Orange reflected contemporary fears that organic solvents and other chemical compounds could provoke a widespread sensitivity crisis in the body, sometimes involving the immune system. These ideas found civilian expression in sick building syndrome, mercury poisoning syndrome and multiple chemical sensitivities, autoimmune diseases and dysregulation of immunological processes caused by modern synthetic chemicals (Shorter 1997; Ford 1997).

9. GULF WAR SYNDROME

To test the hypothesis that GWS was not a unique disorder, 1456 randomly selected veterans awarded pensions for post-combat disorders from 1900 to the Korean conflict were compared with 400 veterans of the Gulf War who believed that they had suffered adverse health effects. Cluster analysis of the 25 most common symptoms showed that no particular war syndrome stood apart (Jones *et al.* 2002b). Three groups were identified: a debility syndrome largely without psychological or cognitive symptoms, a somatic syndrome focused on the heart, and a neuropsychiatric syndrome with a range of associated somatic symptoms:

- (i) Debility cluster ($n=847$): Fatigue, difficulty completing tasks, shortness of breath and weakness were prominent symptoms.

Moderately represented were rapid heartbeat, tremor, headaches, dizziness, pains in joints, difficulty sleeping, changes in weight and anxiety. Psychological symptoms, such as depression, memory impairment, irritability and poor concentration were notably absent. Cases were not drawn from any particular war, though 73.6% of subjects in the group came from wars fought before 1918.

- (ii) Somatic cluster ($n=434$): Rapid heartbeat, shortness of breath, fatigue and dizziness were prominent. Moderately represented were: difficulty completing tasks, headaches, tremor and anxiety. This symptom cluster was indicative of a functional cardiac syndrome, though the group represented only 41.5% of all DAH cases and 44.1% of effort syndrome cases. This reflected the degree of overlap in the three groups and the fact that servicemen diagnosed with functional heart disorders had symptoms related to other areas of the body. Veterans of the First World War comprised 49.1% of the group, a conflict that was dominated by functional cardiac disorders. Relatively few veterans of the Second World War (19.1%) and Gulf War (8.8%) fell into this group.
- (iii) Neuropsychiatric cluster ($n=575$): Fatigue, headaches, depression, anxiety and difficulty sleeping were prominent. Moderately represented were: difficulty completing tasks, forgetfulness, rapid heartbeat, shortness of breath, tremor, dizziness, weakness, pains in joints, back pain, sweating, irritability, poor concentration, jumpiness, changes in personality, nightmares and weight change. Although this cluster included somatic symptoms, it was characterized by a range of psychological symptoms. Over half of the Gulf-related illness samples (54.0%) fell into this group.

GWS has often been attributed to environmental hazards such as depleted uranium, pesticides and the side-effects of vaccinations. However, it may be inferred that all three syndromes appear to be unrelated to any particular exposure as they were found across a range of wars, albeit with different frequencies. An analysis of death certificates also showed that veterans with post-combat syndromes did not develop a particular organic illness or suffered an increased mortality (Grant 1925; Kang & Bullman 2001; Jones *et al.* 2003b). This symptom-based investigation confirmed epidemiological and clinical studies that there is no unique illness related to service in the Gulf in 1991 (Unwin 1999; Lee *et al.* 2002) and yet the term 'GWS' continues to enjoy popular support (Lloyd 2004, pp. 41, 56, 57).

10. DISCUSSION

Medically unexplained symptoms are common but in themselves are not diagnostic of a particular illness or disease; none of them are pathognomonic. Yet because they might indicate the presence of serious pathology, conscientious doctors conducted detailed physical

investigations, which, though negative, were often interpreted by patients as a sign that something serious was amiss. During the Second World War, for example, physicians treating soldiers with suspected duodenal ulcer concluded that multiple investigations focused 'the susceptible soldier's attention increasingly on the stomach and help to perpetuate 'functional' symptoms' (Anonymous 1945, p. 240).

(a) *The influence of culture*

Symptoms, diagnostic labels and culture are not independent but linked in a dynamic relationship (Young 1995). Both doctors and patients were probably more alert to symptoms that related to current health priorities (Shorter 1992). During the First World War, for example, when functional heart disorders accounted for over 15 000 admissions in 1915 and the causes of DAH were still being investigated (Mitchell & Smith 1931, p. 315), cardiac symptoms were given prominence. By proposing the underlying psychological foundation of effort syndrome, Paul Wood and Maxwell Jones at Mill Hill plausibly prevented a fresh epidemic during the Second World War as many such cases were reclassified as psychoneurosis (Wood 1941a-c). Discharges from the British army reflected these trends in medical understanding (Bergman & Miller 2000).

Shorter has argued that the nature of medically unexplained syndromes has itself changed with a shift from apparently neurological symptoms such as paralyses, tremors and fits, to more ill-defined and subjective symptoms such as fatigue, pain and depression (Shorter 1986). The apparent reversal of the trend towards greater psychological attribution during the Gulf War may reflect the biohazards of that conflict or a counter reaction to the increased awareness of PTSD from its formal recognition in 1980.

While cultural forces played an important part in the presentation and recognition of symptoms, they were not the sole factor. In the study by Jones *et al.* (2002b), it is significant that cluster analysis did not reveal a gastrointestinal group composed in the main of veterans of the Second World War. Indeed, soldiers diagnosed with non-ulcer dyspepsia were distributed between all three clusters, though to a lesser extent in the neuropsychiatric group. Similarly, ex-servicemen with a diagnosis of shell shock or neurasthenia were not found in a single cluster associated with the First World War. Some of them exhibited symptoms in common with Gulf War veterans and men who fought in the Boer War. These results suggest that the symptom patterns of war syndromes are diverse and less focused on bodily areas than contemporary descriptions and interpretations have suggested. By no means were all sufferers of post-combat disorders in the First World War troubled by the symptoms of shell shock, and many manifested the traditional cardiac picture of DAH. Effort syndrome endured well into the Second World War when stomach problems and psychological symptoms were thought to dominate. It appears, therefore, that culture may play less of a part in determining symptom patterns than has been suggested. Its main impact may relate to explanations and the ways that physicians categorize and interpret

functional somatic presentations and the ways that patients act on and explain their symptoms. Thus, culture can often condition a novel medical explanation that satisfies most of society at a particular time but at the cost of ignoring exceptions and continuities (Jones & Wessely 2005b).

(b) *Advance of medical knowledge*

The progressive advance of medical knowledge has both eliminated areas of the body as potential sites for medically unexplained symptoms but also created areas of uncertainty to which they could be attached. DAH flourished for 80 years largely because the heart was a no-go area for surgery, while medication for cardiac disease was limited. Because investigative techniques were limited to auscultation and percussion, together with post-mortem studies, cardiologists tended to conceptualize heart disease in terms of morbid anatomy, such as deformity of the valves. As a result, they struggled to understand disturbances of function, often failing to distinguish between serious disease and non-organic abnormalities. In acute febrile illness, for example, the hyperdynamic circulation can produce a systolic murmur, which in the late nineteenth century was sometimes misinterpreted as a sign of an organic lesion.

Citing the example of hysterical paraplegia, Shorter demonstrated that this disorder was doomed once neurologists had developed accurate neurophysiological methods to distinguish between organic and psychological causation (Shorter 1986). This example suggests that it is unlikely that non-ulcer dyspepsia will ever again be a prominent medically unexplained syndrome. The discovery of histamine H₂-antagonists as an effective treatment of peptic ulcer in 1976, subsequent research into the pathological role of *Helicobacter pylori* and the development of accurate endoscopic techniques have removed any doubt or mystery surrounding stomach disorders. Today medically unexplained symptoms are often associated with the immune and central nervous systems, hence the popularity of explanations that involve toxins or the side effects of medicines.

(c) *Changing nature of warfare*

The nature of war and tactical doctrine have changed dramatically over the last century. Troops who fought in the Boer War often had to march considerable distances to engage the enemy; it was a war of movement without mechanization. Contemporaries believed that the physical exertion involved was, in part, responsible for the various heart disorders encountered. Similarly, shell shock was framed in terms of trench warfare: an expression of the terror felt by men forced to endure the effects of artillery bombardment often without adequate protection and in identifiable positions. Fifty-nine per cent of wounds inflicted on British soldiers were as a result of artillery, and three times as many men were killed by shells as by bullets.

Although professional soldiers are better protected than ever before with flak jackets, NBC suits, vaccination programmes and armoured vehicles, they are also at risk from a greater range of more potent weapons. The threat of chemical and biological warfare

has perhaps found expression in symptoms of headache, poor concentration and memory impairment. While the pace of battle has quickened and its technical complexity advanced, at root combat still involves soldiers risking their lives. In its fundamentals, the stress of battle has not changed as troops in the teeth arms are still required to kill or be killed.

An analysis of the military records of servicemen in the Jones *et al.* (2002b) study revealed that the proportion involved in actual fighting fell over time as numbers in combat-support roles has risen. Of the Boer War veterans, 77% had been in combat, of the First World War pensioners 73.4%, of the Second World War sample 52%, while only 19.8% of the Gulf War sample had seen action. War syndromes arose, therefore, not only in servicemen who fought but also those faced with the prospect of battle.

11. CONCLUSIONS

Post-combat syndromes have arisen after all major wars over the last century, and we can predict that they will continue to appear after future conflicts. What cannot be accurately forecast is their form as they are moulded by the changing health fears and the nature of warfare itself. They have proved notoriously difficult to treat largely because veterans and their physicians were often in disagreement about causation. Having recognized the need to offer financial compensation to ex-servicemen disabled as a result of wounds and disease, it was then impossible to exclude war syndromes as pensionable disorders. As a result, they have cost the state considerable sums and proved an emotive focus for dispute. To introduce preventative measures and devise effective clinical interventions, it is necessary to understand their characteristics and the circumstances in which they arise. If each new post-combat syndrome is not interpreted as a unique or novel illness, but as part of an understandable pattern of normal responses to the physical and psychological stress of war, then it may plausibly be managed in a more effective manner.

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